CARPAL TUNNEL SYNDROME

I. BACKGROUND

Carpal tunnel syndrome, also known as tardy median nerve palsy, is believed to be caused by local impairment of the median nerve at the carpal canal in the wrist secondary to narrowing or crowding of the nerve in the carpal tunnel. The condition may have multiple causes including 1) space-occupying lesions such as the residual of a wrist fracture, infections, local edema, tumors, flexor tenosynovitis (non-specific as well as that associated with rheumatoid arthritis), foreign bodies, or aberrant muscles; 2) systemic conditions such as pregnancy, obesity, diabetes mellitus, thyroid dysfunction, arthritis, or amyloidosis; 3) overuse of hand and wrist, work-related trauma and repetitive movements, constricting bandages around the wrist, or improper postural habits regarding the wrist joint; or 4) it may have a spontaneous or idiopathic onset. The condition can occur at any age but is most often encountered in patients over 30 years in age. It occurs three to five times more frequently in women than men.

II. DIAGNOSTIC CRITERIA

A. Pertinent Historical and Physical Findings

Patients complain of paresthesias and numbness in all or part of the sensory distribution pattern of the median nerve in the hand, which often worsen at night when lying in bed. These sensations are occasionally associated with pain that may radiate proximally to the shoulder area. The most characteristic history involves nocturnal paresthesias, described frequently as sensations of burning or numbness that may be relieved by shaking or holding the affected arm in the dependent position. Weakness of grip, hypohydrosis, clumsiness and proximal pain migration may be accompanying complaints. Wrist palmar flexion may aggravate the symptoms, and the patient may note difficulty manipulating small objects. Occasionally, patients may complain of circulatory disturbances in the fingers.

Symptoms may be reproduced by hand and wrist motions, such as forced flexion and extension of the wrist, that constrict the carpal canal. This tendency forms the physiologic basis for the Phalen Test, which may be positive in the presence of median nerve compression at the wrist. The patient may exhibit dryness of the skin on the hand and fingers, thenar muscle atrophy or fasciculations, and decreased pinch or grip strength. There may be increased median nerve two-point discrimination. Tinel's sign may be positive. These tests are strongly corroborative, but their absence does not exclude this diagnosis.

B. Appropriate Diagnostic Tests and Examinations

1. Radiographs of wrist

2. Electromyogram and nerve conduction studies

3. Hematologic, serologic, and endocrinologic studies if symptoms suggest an underlying systemic disease

4. Response to steroid injection into carpal canal

5. Anteroposterior and lateral oblique radiographs of cervical spine if symptoms suggest origin in the cervical spine

6. Chest radiograph, if there is concern about brachial plexus or apex of lung

C. Supporting Evidence

The electromyograph and nerve conduction tests are helpful when positive but can be negative in some patients with this disorder. They are useful in atypical patients or in patients in whom secondary gain may be a motive. The most difficult differentiation involves patients with diabetes mellitus and suspected carpal tunnel syndrome. Some patients with neuropathies may be difficult to assess. Electrodiagnostic studies may facilitate the assessment of patients with both neuropathy and suspected carpal tunnel syndrome. In patients with suspected double-crush

syndrome, electrodiagnostic tests may be helpful in determining the relative contributions of each site of compression.

III. TREATMENT

A. Outpatient Treatment

1. Nonoperative treatment - Treatment time limited to 3 to 6 weeks, provided all appropriate conservative measures have been assessed.

a. Indications
1) Mild symptoms
2) Pregnancy
3) If constricting bindings or positional abnormalities are causative

b. Treatment Options
1) Neutral position wrist splint, especially at night
2) Steroid injections
3) Nonsteroidal anti-inflammatory drugs
4) Activity modification
5) Treatment of underlying systemic disease
6) Removal of constricting bindings or bandages

c. Rehabilitation
1) Hand and wrist exercises
2) Grip strengthening exercises
3) Modification of activities of daily living and/or job tasks

d. Supporting evidence consists of favorable response to steroid injections and to the use of a wrist splint in the absence of objective evidence of denervation.

2. Ambulatory Surgery

a. Indications
1) Failure to respond to nonoperative treatment
2) Presence of thenar atrophy or weakness or significant hyperesthesia/dysesthesia (especially with objective impairment of sensibility as determined by two-point discrimination or by light touch)
3) Progressive symptoms
4) Presence of space-occupying lesion in carpal canal

b. Treatment Options
1) Release of transverse carpal ligament, either under local or regional block

c. Rehabilitation
1) Elevation of hand and exercise of fingers and shoulder
2) Wrist splint in position of slight extension for two to three weeks postoperatively

B. Estimated Duration of Care

1. Nonoperative treatment - maximal medical improvement
2. Operative treatment - three to six weeks following surgery.

PROTOCOL HISTORY:
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